Docket No.: 1560-0348P
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Yasuhiro ISHII et al.

Application No.: 09/655,847 Confirmation No.: 009788

Filed: September 6, 2000 Art Unit: 3682

For: ELECTRIC POWER STEERING APPARATUS Examiner: W. C. Joyce

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As required under § 41.37(a), this brief is filed in support of the Notice of Appeal filed in this case on May 23, 2006, and is in furtherance of said Notice of Appeal. A Notice of Panel Decision on Pre-Appeal Brief Review was mailed on July 18, 2006, and extensions of time are therefore calculated starting one month from that date.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

I.	Real Party In Interest
II	Related Appeals and Interferences
III.	Status of Claims
IV.	Status of Amendments
V.	Summary of Claimed Subject Matter
VI.	Grounds of Rejection to be Reviewed on Appeal
VII.	Argument

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Koyo Seiko Co., Ltd.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 12 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 8 and 13
2. Claims withdrawn from consideration but not canceled: 5 and 6
3. Claims pending: 1-7, 9-12 and 14
4. Claims allowed: none
5. Claims rejected: 1-4, 7, 9-12 and 14

C. Claims On Appeal

The claims on appeal are claims 1-4, 7, 9-12 and 14

IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment After Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following description is an exemplary reading of the claim language on embodiments of the present application and is not intended to limit the scope of the claims.

Independent Claim 7

Claim 7 recites an electric power steering apparatus and a steering shaft 2 that is configured to engage a steering wheel 1 as illustrated in Figure 2. With reference to Figure 3, the power steering apparatus includes an electric motor 6 (page 7, lines 20-24) for steering assistance and a worm shaft 70 (page 9 line 21) on which a worm (71) is disposed. A worm wheel 72 is disposed on the steering shaft 2, and rotary motion of the electric motor 6 is transmitted through the worm shaft 70 to the worm wheel 72 (page 9, line 19 through page 10, line 4). A biasing member 30 biases the worm shaft 70 toward the worm wheel 72 via a bearing 17 (page 10, lines 19-21). In addition, a concave member 83 accepts the bearing 17, and a housing 8 houses the bearing 17 and the concave member 83. Furthermore, the biasing member 30 is movably acceptable only toward the concave member 83.

Claim 1

Claim 1 depends from claim 7 and further recites that the biasing member 30 biases the worm shaft 70 toward the worm wheel 72 in a deflective direction of the worm shaft 70.

Claim 2

Claim 2 depends from claim 1 and recites that the worm shaft 70 is deflectable in a side of the worm shaft (the right side in Figure 3) interlocked with an output shaft 60 of the electric motor 6.

Claim 3

Claim 3 depends from claim 1 and recites that the worm shaft 70 is supported in a gear housing 8 having a tapped hole 84 and that the biasing member 30 includes a screw body 33 tightly fastened in the tapped hole 84. A spring body 32 is interposed between the screw body 33 and the worm shaft 70.

Claim 4

Claim 4 depends from claim 1 and recites that the worm shaft 70 is supported in a gear housing 8 having a tapped hole 84 and the biasing member 30 includes a screw body 33 which is tightly fastened in the tapped hole 84 and which is in contact with the worm shaft 70 or a bearing 17 fitted to the worm shaft 70.

Claim 10

Claim 10 depends from claim 7 and recites that the bearing 17 may be deflected into the concave member 83.

Claim 11

Claim 11 depends from claim 7 and recites that the steering wheel 1 is directly connected to the steering shaft 2.

Claim 14

Claim 14 depends from claim 1 and describes a space between the concave member 83 and the biasing member 30. The space is defined in part by second bearing hole 82 and can be seen in Figure 4. When biasing member 30 biases the worm 71 toward the worm wheel 72, the biasing member 30 moves within the space and is accepted in the concave member 83.

Independent Claim 9

With reference to Figure 2, claim 9 recites an electric power steering apparatus and a

steering shaft 2 having a worm wheel 72 (Figure 3), the steering shaft 2 being configured to engage a steering wheel 1. With reference to Figure 3, the power steering apparatus includes an electric motor 6 for steering assistance and a worm shaft 70 on which a worm 71 is disposed. A rotary motion of the electric motor 6 is transmitted through the worm shaft 70 to the worm wheel 72. A biasing member 30 biases the worm shaft 70 toward the worm wheel 72 via a bearing 17, and a housing 8 that directly holds the bearing 17 is the same housing 8 that holds the biasing member 30. A concave member 83 accepts the bearing 17. The biasing member 30 is movably acceptable only toward the concave member 83.

Independent Claim 12

Claim 12 recites an electric power steering apparatus, illustrated in Figure 2, that includes an electric motor 6 for steering assistance and a worm shaft 70 on which a worm 71 is disposed. A worm wheel 72 is fixedly held on a steering shaft 2 connected to a steering wheel 1, and the rotary motion of the electric motor 6 is transmitted through the worm shaft 70 to the steering shaft 2. A biasing member 30 biases the worm shaft 70 toward the worm wheel 72 to reduce or eliminate backlash, and the biasing member 30 is movably acceptable only toward the concave member 83.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-4, 7, 9-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 60-191758 (hereinafter, "Kamimura") in view of Eda, U.S. 6,044,723.

It is noted that the 35 U.S.C. 102(e) rejection from the final Office Action based on Arai, U.S. 6,527,642, was withdrawn in the Advisory Action mailed April 21, 2006, and is therefore not addressed herein.

VII. ARGUMENT

A. A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN PRESENTED

Section 706.02(j) of the MPEP provides that when an examiner makes a rejection under Section 103, he should "set forth in the Office action: (A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate, (B) the difference or differences in the claim over the applied reference(s), (C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification." Neither the May 17, 2005, Office Action nor the November 23, 2005, Office Action, provides such information, and the specific grounds for rejecting the claims are therefore difficult to determine. Both Office Actions merely state that "Kamimura teaches a worm gear arrangement having the claimed biasing device for biasing a worm into engagement with a worm gear." The elements recited the claims are not mentioned in the rejection. It is not until the April 21, 2006, Advisory Action that the examiner finally identifies elements of Kamimura by reference number to explain his interpretation of this reference.

In the Advisory Action, the examiner notes that he explained his reasoning to Applicant's representative during a February 15, 2006, interview, and argues that that explanation should have made his position clear. However, the interview was conducted three months after the date of the final Office Action. It is respectfully submitted that Applicant should not have to wait for a post-final Office Action interview or an Advisory Action to first learn the basis for an examiner's rejection. The examiner asserted in the Advisory Action that the interview gave the applicant "a reasonable opportunity to respond to the rejection." However, the fact that no claim amendments can be made as of right after a final rejection calls into question the reasonableness of any such opportunity. The rejections do not comply with Section 706.02(j), neither a proposed modification to a reference nor a motivation for making such a modification is presented, and it is therefore respectfully submitted that the record does not present a prima facie case of obviousness. All pending claims are submitted to be allowable over Kamimura and Eda

for at least this reason as well as for the reasons provided below.

Independent Claim 7

The Office Actions indicate that claim 7 is rejected over Kamimura in view of Eda. This rejection is difficult to interpret given the examiner's failure to discuss the language of claim 7 in the Office Action. This rejection and a possible alternative rejection that may have been intended by the examiner are discussed below to the extent they can be determined from the record.

Kamimura discloses a worm and a worm wheel and a mechanism for moving the worm relative to the worm wheel. However, Kamimura does not disclose at least 1) an electric power steering apparatus, 2) an electric motor for steering assistance or 3) a steering shaft on which a worm wheel is disposed that is configured to engage a steering wheel. Eda is cited to show a power steering apparatus. Because the power steering apparatus has a motor and a steering shaft, it is alleged that claim 7 is unpatentable over Kamimura and Eda.

To reject claim 7 as being unpatentable over Kamimura in view of Eda, the record should show why one skilled in the art would add an electric motor and a steering shaft to Kamimura's device. Kamimura's device does not appear to be related to power steering and includes what appears to be a hand-actuated knob 24 for adjusting a worm wheel via a worm shaft. The alleged motivation for adding an electric motor, etc. to Kamimura's device is stated to be "to provide a means for adjusting the biasing force and/or the engagement of the worm gears." However, Kamimura already provides a mechanism for adjusting the engagement of the worm gears. There is thus no reason one skilled in the art would look to Eda to make such a modification to Kamimura. Therefore, a motivation to modify Kamimura based on Eda has not been provided, a prima facie case of obviousness has not been presented, and claim 7 is submitted to be allowable over these references.

Based on the language of the rejection, it appears the examiner may have intended to reject claim 7 based on Eda in view of Kamimura. Applicant does not agree that a proper motivation to make this modification has been provided. However, the asserted motivation for modifying the references appears to be a statement that Eda should be modified in view of the

teachings of Kamimura. While this rejection was not specifically raised, it appears to be the rejection intended by the examiner and will therefore be addressed below.

Eda discloses a power steering apparatus that includes a worm shaft, a worm on the worm shaft and a worm wheel. The examiner may be arguing it would have been obvious to bias Eda's worm toward Eda's worm wheel the same way Kamimura biases a worm toward a worm wheel. However, no reason for adding Kamimura's biasing mechanism to Eda's power steering system has been identified. The asserted motivation is "to provide a means for adjusting the biasing force and/or the engagement of the worm gears." It is respectfully submitted that this is a tautological argument - the motivation for providing a means for adjusting the biasing force is to provide a means for adjusting the biasing force. No reason has been provided to show why one skilled in the art would find it desirable to adjust the biasing force in the first place. The statement in the final Office Action that Kamimura's mechanism "could be used" in Eda also fails to establish a motivation for modifying references. As provided by MPEP 2143.01, the fact that a modification might be possible does not constitute a motivation for making the modification.

Eda describes thirteen different embodiments of his invention, each including a mechanism for addressing axial backlash. One embodiment (the eighth) also includes O-rings for absorbing forces normal to the axis of a worm shaft. Nothing in Eda suggests a need to adjust the engagement of a worm with a worm wheel. Nothing in Kamimura's drawings or the English abstract provides any reason for adjusting the engagement between a worm and worm wheel. No reason for modifying Eda based on Kamimura has been provided and therefore a prima facie case of obviousness has not been presented. Claim 7 is submitted to be allowable over the references of record for at least these reasons.

Independent Claim 9

The Office Actions does not address independent claim 9 separately from the other claims. All arguments presented above in connection with claim 7 regarding failure to explain the rejections or provide a motivation for modifying Kamimura in view of Eda or Eda in view of Kamimura are submitted to apply to claim 9 as well. In addition, claim 9 requires that a housing

that directly holds a bearing is the same housing that holds a biasing member. This can be seen, for example, in Figure 3 of the present application. However, Kamimura shows bearing 43 retained in element 42 while Kamimura's biasing arrangement is substantially enclosed in housing 21. The record in no manner suggests that a housing that directly holds a bearing should be the same housing that holds a biasing member, and claim 9 is submitted to be allowable over Kamimura and Eda for this reason as well.

Independent Claim 12

The Office Actions does not address independent claim 12 separately from the other claims. All arguments presented above in connection with claim 7 regarding failure to explain the rejections or provide a motivation for modifying Kamimura in view of Eda or Eda in view of Kamimura are submitted to apply to claim 12 as well. In addition, claim 12 requires that the biasing member bias the worm shaft toward the worm wheel to reduce or eliminate backlash. This limitation is not addressed in the Office Actions. Claim 12 is submitted to be allowable over the references of record for this reason as well.

B. THE DEPENDENT CLAIMS HAVE NOT BEEN ADDRESSED

Various dependent claims will be addressed individually below. However, it is noted that the limitations of these claims are not mentioned in the May 17, 2005, Office Action or the November 23, 2005, Office Action. In the Advisory Action dated April 21, 2006, the examiner does mention independent claim 3 for the first time, but only to acknowledge that the limitations of that claim are not shown in the references of record. It is believed that this statement alone should have required the issuance of a further non-final Office Action in which claim 3 was allowed or rejected based on new art. The statement in the Office Action that claim 3 could be "rejected based on an obviousness type rejection" does not present a prima facie case of obviousness in connection with this claim. As discussed below, claim 3 and the claims depending from claim 7 further distinguish over the references of record.

Claim 2

Claim 2 recites an interlocking member interlocking the worm shaft and a motor output shaft. The art of record does not show or suggest an interlocking member as claimed. Claim 2 is submitted to further distinguish over the art of record for this reason.

Claim 3

Claim 3 recites that the worm shaft is supported in a gear housing having a tapped hole, that the biasing member includes a screw body tightly fastened in the tapped hole and that a spring body is interposed between the screw body and the worm shaft. Such a structure is not present in the art of record as acknowledged by the examiner. Claim 3 is submitted to be further distinguish over the art of record for this reason.

Claim 4

Claim 4 recites that the worm shaft is supported in a gear housing having a tapped hole and that the biasing member includes a screw body tightly fastened in the tapped hole and in contact with the worm shaft or a bearing fitted to the worm shaft. Such a structure is not present in the art of record, and claim 4 is submitted to be further distinguish over the art of record for this reason.

Claim 10

Claim 10 recites that the bearing may be deflected into the concave member. Kamimura shows a bearing that appears to contact the element alleged to be a concave member around the entire circumference of the bearing. The bearing therefore cannot be deflected into the concave member as required by claim 10. Claim 10 further distinguishes over the art of record for this reason.

Claim 14

Claim 14 recites that a space is established between the concave member and the biasing member. If spring 48 of Kamimura is a biasing member and element 41, 42 of Kamimura is the

concave member, as asserted in the Advisory Action, then these elements are in contact with one another, and there is no space between these elements as recited in claim 14. Claim 14 is submitted to further distinguish over the art of record for this reason.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

IX. CONCLUSION

For the foregoing reasons, it is respectfully submitted that claims 1-4, 7, 9-12 and 14 are allowable over the art of record. Wherefore, reconsideration and allowance of these claims is earnestly solicited.

Dated: November 17, 2006

Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 09/655,847

1. The electric power steering apparatus of claim 7, wherein
the biasing member biases said worm shaft deflectable toward said worm wheel, in a deflective direction of said worm shaft.

2. The electric power steering apparatus of claim 1, wherein
said worm shaft is deflectable in a side of said worm shaft, interlocked with an output shaft of said electric motor and an interlocking member interlocking said worm shaft and said output shaft is provided therebetween.

3. The electric power steering apparatus of claim 1, wherein
said worm shaft is supported in a gear housing having a tapped hole, and said biasing member includes a screw body tightly fastened in said tapped hole and a spring body interposed between said screw body and said worm shaft.

4. The electric power steering apparatus of claim 1, wherein
said worm shaft is supported in a gear housing having a tapped hole, and said biasing member includes a screw body which is tightly fastened in said tapped hole and which is in contact with said worm shaft or a bearing fitted to said worm shaft.

7. An electric power steering apparatus, comprising:
an electric motor for steering assistance;
a worm shaft on which a worm is disposed;
a steering shaft, configured to engage a steering wheel, on which a worm wheel is disposed and to which a rotary motion of said electric motor is transmitted through said worm shaft;
a biasing member biasing, via a bearing, said worm shaft toward said worm wheel;

a concave member accepting said bearing; and

a housing for housing said bearing and said concave member, wherein the biasing member is movably acceptable only toward the concave member.

9. An electric power steering apparatus, comprising:

an electric motor for steering assistance;

a worm shaft on which a worm is disposed;

a steering shaft, configured to engage a steering wheel, on which a worm wheel is disposed and to which a rotary motion of said electric motor is transmitted through said worm shaft;

a biasing member biasing, via a bearing, said worm shaft toward said worm wheel, wherein a housing that directly holds the bearing is the same housing that holds the biasing member; and

a concave member accepting the bearing, wherein the biasing member is movably acceptable only toward the concave member.

10. The electric power steering apparatus of claim 7, wherein the bearing may be deflected into the concave member.

11. The electric power steering apparatus of claim 7, wherein the steering wheel is directly connected to the steering shaft.

12. An electric power steering apparatus, comprising:

an electric motor for steering assistance;

a worm shaft on which a worm is disposed;

a worm wheel fixedly held on a steering shaft connected to a steering wheel, wherein the rotary motion of the electric motor is transmitted through the worm shaft to the steering shaft;

a biasing member biasing the worm shaft toward the worm wheel to reduce or eliminate backlash, wherein the biasing member is movably acceptable only toward the concave member.

14. The apparatus of claim 1, wherein a space is established between the concave member and the biasing member, wherein when the biasing member biases the worm toward the worm wheel, the biasing member moves within the space to be accepted in the concave member.

APPENDIX B -- (EVIDENCE APPENDIX)

No evidence is being relied upon and no evidence is attached.

APPENDIX C -- (RELATED PROCEEDINGS APPENDIX)

There are no related proceedings.